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Flatbugs from Paleogene limnic sediments. III. Enspel (Heteroptera: Aradidae)

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Abstract

Neuroctenus enspelensis n.sp., a new fossil flat bug species of the family Aradidae, subfamily Mezirinae, from the Upper Oligocene lacustrine shales of Enspel, Germany is described and figured.

Zusammenfassung

Eine neue Aradidae (Rindenwanze), *Neuroctenus enspelensis* n.sp. aus der oberoligozänen Fossillagerstätte Enspel im Westerwald, Bundesrepublik Deutschland, wird nachstehend beschrieben und abgebildet.

Key words : Heteroptera, Aradidae, *Neuroctenus*, Paleogene, Upper Oligocene, Enspel, Westerwald, new species.

Introduction

The Upper Oligocene Fossillagerstätte Enspel in the Westerwald area of Germany (Fig. 1) is a site rediscovered just a decade ago (WUTTKE & RADTKE 1993a). Since 1990 studies have developed towards a multidisciplinary approach to the site. Lake sediments covered by a basaltic blanket yield abundant remarkably preserved plants (leaves, fruits, seeds, palynomorphs) and animals (mammals, crocodiles, amphibians, fishes, insects) (e.g. STORCH et al. 1996), complete with soft body outline. In particular a few insect taxa retain the original iridescent colour and beetle cuticles revealed the overlapping layers of chitin fibres and even components of the chitin macromolecule have survived over 25 Ma (STANKIEWICZ et al. 1997).

Based on the mammal remains, especially the occurrence of *Eomys quercyi*, the age of the Lagerstätte has been correlated to the mammal zone MP 28 (STORCH et al. 1996). This is equivalent to the Upper Oligocene and a paleomagnetic age of about 25,8 Ma. New data obtained from the overlying volcanic material indicate an age of about 24,7 Ma.

WEDMANN (1996, 1998a, b) was the first researcher to study systematically the Enspel insects as part of her larger monograph of the whole taphocoenosis (2000). Coleoptera (Curculionoidea) and Diptera (Bibionidae) represent the dominant insect orders in Enspel (WEDMANN 2000).

About 180 species assigned to the genus *Neuroctenus* are described to date, which are predominantly distributed and most diverse in the Hylaea of tropical and subtropical

regions. Only 22 species are known from the East-Palaearctic region (HEISS 2001), none from Europe. The only fossil records of this genus are a species of Miocene age decribed from Thailand (ENDO & FUJIYAMA 1966) and three species of Lower Middle Eocene age from the Messel and Eckfeld oil shales (WAPPLER & HEISS 2006a, b). In the present paper a new fossil species from limnic sediments is described and figured.

Material and methods

The fossiliferous sediments are mainly dark-coloured oil shales with different types of lamination and variable composition (CLAUSING 1998). Included are tuff and tuffitic layers which are best observable in the excavation sections. Components of the phytoplankton recognized are diatoms, chrysophytes, green algae (*Tetraedron, Botryococcus*). Cyanobacteria are also present, preserved as alginite (CLAUSING 1998) or as filamentous microbial mats (WUTTKE & RADTKE 1993a, b).

A preliminary model of the geology was based on some small scale core drillings (GAUPP & WILKE 1998) and correlated with surface data from the excavations. Further data were obtained from a complete core resulting from a research drilling in 1996 which reached a depth of 256 m (FELDER et al. 1998). Geophysical and geological investigations showed that Enspel is part of a complex volcanotectonic structure (Fig. 2). Whether the lake developed in a graben, a maar, or a caldera has not been clarified (PIRRUNG 1998).

The fossil specimen examined in the present paper is deposited in the collections of the Landesamt für Denkmalpflege Rheinland-Pfalz, Referat Erdgeschichtliche Denkmalpflege, Mainz, Germany. The specimen was studied by immersing the slab in glycerine, which is also used to prevent oxidation. All measurements were made by using an ocular micrometer; structures were measured as preserved.

The suprageneric classification of Aradidae follows that of the recent Catalogue of the Heteroptera of the Palaearctic Region (HEISS 2001).

Systematics

Order Hemiptera Linnaeus, 1758

Suborder Heteroptera Latreille, 1810

Infraorder Pentatomomorpha Leston, Pendergrast & Southwood, 1954

Superfamily Aradoidea Brullé, 1836

Family Aradidae Brullé, 1836

Subfamily Mezirinae Oshanin, 1908

Neuroctenus enspelensis **n.sp.** (Fig. 2 A,B)

Material examined : Holotype, macropterous male, collection-no. 5992, figured in WEDMANN (2000: Taf. 2, Fig. 3). Nearly complete specimen dorsoventrally compressed, with body and appendages finely granulated. Deposited in the Landesamt für Denkmalpflege Rheinland-Pfalz, Referat Erdgeschichtliche Denkmalpflege, Mainz, Germany.

Geographic distribution: Enspel, near Bad Marienburg, Westerwald Mountains, Germany. Fossil site G2, horizon S16.

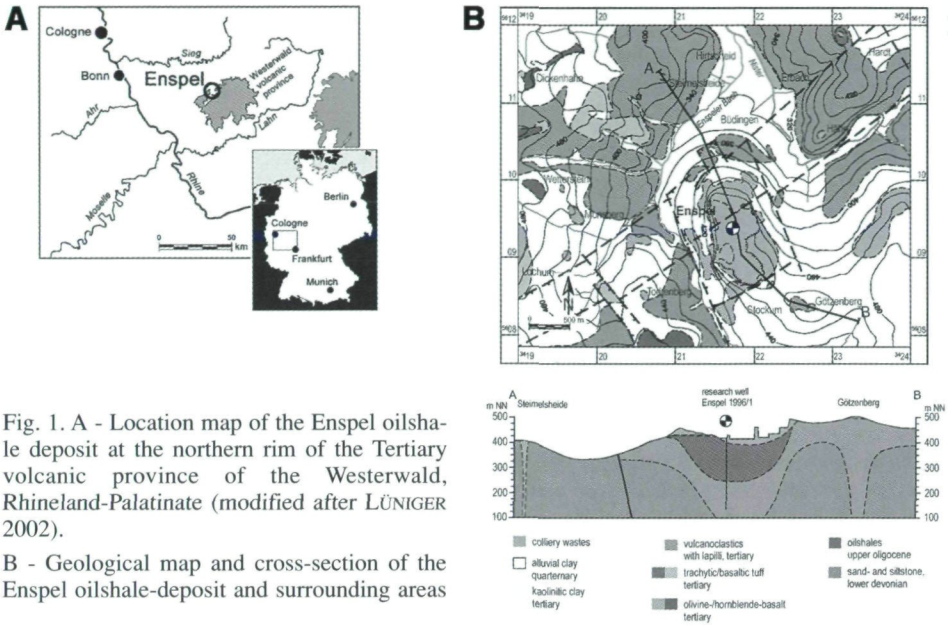

Fig. 1. A - Location map of the Enspel oilshale deposit at the northern rim of the Tertiary volcanic province of the Westerwald, Rhineland-Palatinate (modified after LÜNIGER 2002).

B - Geological map and cross-section of the Enspel oilshale-deposit and surrounding areas

Stratigraphic occurrence: Upper Oligocene, (NALMA Geringean, MP28, ~ 25 Ma).

Measurements (in mm): Length 4.47; length of antennae (as preserved) 0.56 (0.25 : 0.17 (part) : 0.14 (part); width of pronotum (as preserved) 1.07, length 0.74; width of scutellum 0.65, length 0.52; width of abdomen (as preserved) 1.43, length 2.71.

Description:

Head: About as long as wide across eyes. Clypeus tapering towards apex, about as long as antennal segment I; antenniferous tubercles rather blunt; only antennal segments I and II (partially) are preserved, the latter is thinner than the preceding one; postocular lobes rounded, not reaching outer margins of eyes.

Pronotum: Trapezoidal, more than twice as wide as long, anterior margin concave at middle, posterior margin nearly straight. Lateral margins sinuate, anterolaterally broadly rounded. Disk flat with granulate structure.

Scutellum: Triangular, lateral margins slightly sinuate, apex rounded; disk transversely rugose.

Hemelytra: Not preserved, only the long clavus and short corium are discernible, indicating an originally macropterous status of the specimen.

Abdomen: Elongate oval, lateral margins of laterotergites (Dltg) II-VII evenly rounded, their posterolateral angles not projecting; a longitudinal submarginal carina is present on Dltg II – VI. The posteriorly rounded remnants of tergite VIII most probably present the outline of the pygophore.

Legs: Femora fusiform moderately thickend; tibiae cylindrical, preserved in fragments only.

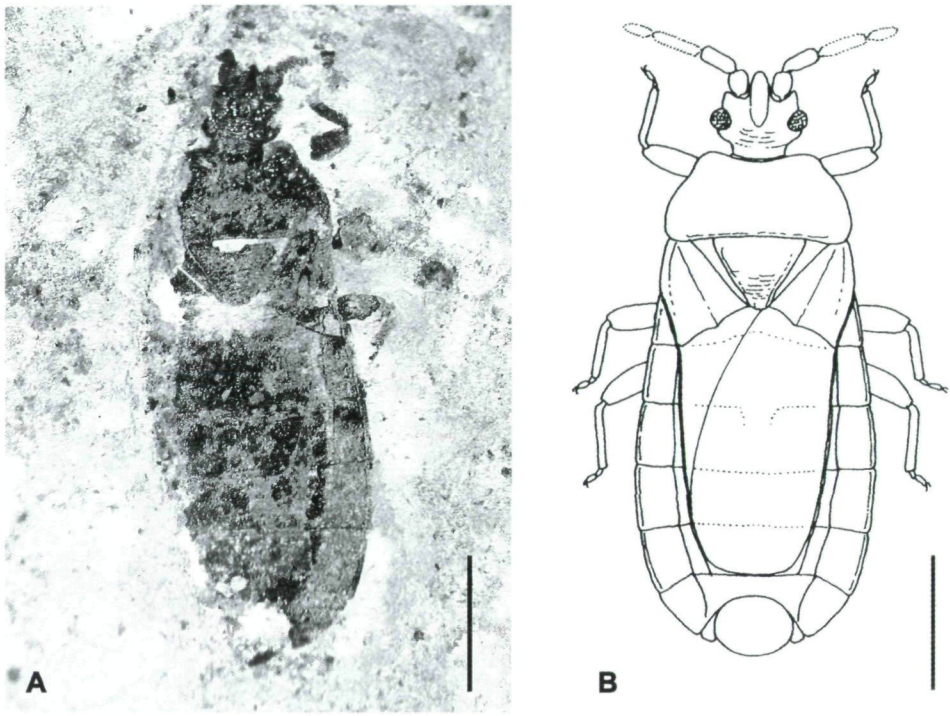

Fig. 2. *Neuroctenus enspelensis* n. sp. A - Photomicrograph of holotype (No. 5992); B - Habitus reconstruction of holotype, dorsal view; Scale bar = 1 mm.

Etymology : Named after the type locality Enspel.

Discussion : The slender habitus, triangular shape of scutellum and the presence of a submarginal carina on Dltg II – VI are characters usually present in the genus *Neuroctenus*, to which this fossil specimen is assigned. The visible transverse sutures separating the abdominal segments may be those of the ventral side, as the tergal sutures are usually modified and reduced in most Mezirinae. *Neuroctenus enspelensis* n.sp. differs from the previously described much older Middle Eocene taxa *N. kotejai* and *N. messselensis* (WAPPLER & HEISS 2006a) and *Neuroctenus incompletus* (WAPPLER & HEISS 2006b) by a different structure of head, pronotum and abdomen.

A c k n o w l e d g m e n t s

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